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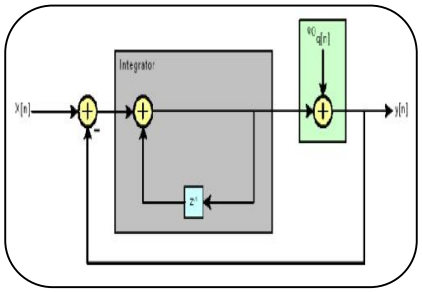
THEORETICAL CONSIDERATION OF QUANTIZATION CHARACTERISTICS OF SIGMA DELTA MODULATION



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ABSTRACT

The process of converting an analog signal which has infinite resolution into a finite range number system introduces an error signal that depends on how the signal is being approximated. This quantization error is on the order of one least-significant-bit (LSB) in amplitude, and it is quite small compared to full-amplitude signals. However, as the input signal gets smaller, the quantization error becomes a larger portion of the total signal. Quantization is a mathematical term.

The method of converting an analog signAL which has infinite resolution right into a finite range number device introduces an errors sign that depends on how the sign is being approximated. This quantization blunders is on the order of one least-full-size-bit (lsb) in amplitude, and it's miles pretty small as compared to full-amplitude indicators. However, as the input signal receives smaller, the quantization error will become a larger part of the overall signal. Quantization is a mathematical time period.

KEYWORDS: *least-significant-bit (LSB) , process of converting , approximated.*

INTRODUCTION :

It's also used in virtual sign processing. It's miles the method of mapping a large set of enter values to a countable smallerset. Rounding and truncation are standard examples of quantization methods. Quantization is worried to a few degree in nearly all digital indicators processing, because the technique of representing a sign in virtual shape usually includes rounding. Quantization additionally paperwork the middle of basically all lossy compression algorithms. The distinction between an enter price and its quantized cost, such as round-off blunders is known as quantization error. A device or algorithmic characteristic that performs quantization is called a quantizer. An analog-to-virtual converter is an instance of a quantizer.[1-6]

QUANTIZATIONOF ANALOG SIGNAL:

While a sign is quantized, the ensuing signal approximately has the second one-order records of a signal with unbiased additive white noise. Right here, we assume that the signal price is within the variety of 1 step of the quantized value.In fact, the quantization noise is of direction not impartial of the sign; this dependence is the source of idle tones and pattern noise in sigma-delta converters.The technique of quantization may be defined with the figure given in determine #1.Right here authentic signal is represented in the curve of colorgreen. The yellow shade curve is quantized signal. The quantization noise s creep with the signal that is proven in brown shade curve

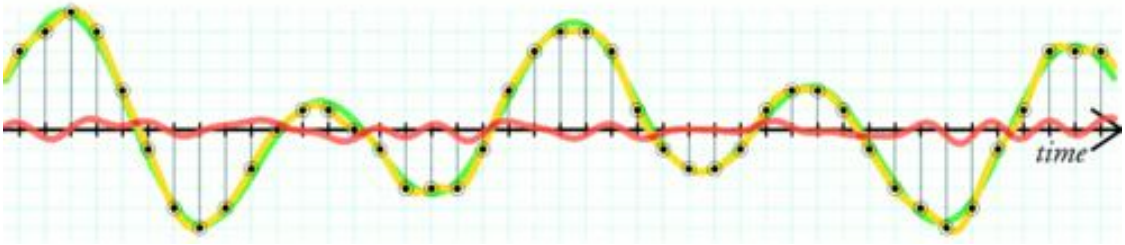

Figure N.O. 1, ORIGINAL SIGNAL, QUANTIZED SIGNAL,QUANTIZATION NOISE

The most effective manner to quantize a signal is to pick out the virtual amplitude value closest to the unique analog amplitude. This situation indicates the original analog signal (green), the quantized signal (black dots), the sign reconstructed from the quantized signal (yellow) and the distinction among the original signal and the reconstructed signal (purple). The difference among the unique signal and the reconstructed signal is the quantization blunders and, in this simple quantization scheme, is a deterministic characteristic of the input signal.

BASIC PROPERTIES OF QUANTIZATION:

Due to the fact quantization is a many-to-few mapping, it's miles an inherently non-linear and irreversible process because the identical output cost is shared by way of a couple of enter values, it is not possible in preferred to recover the precise enter price whilst given most effective the output fee.
The set of viable enter values can be infinitely large, and may probably be continuous and therefore uncountable ,along with the set of all real numbers, or all actual numbers inside a few constrained range. The set of viable output values may be finite or countable. The input and output units involved in quantization can be described in a as an alternative standard way. For instance, vector quantization is the application of quantization to multi-dimensional enter facts.[1].

ANALOG-TO-DIGITAL CONVERTER:

Outside the realm of sign processing, this class may additionally without a doubt be referred to as as rounding or scalar quantization. An adc tactics: sampling and quantization. Sampling converts a voltage signal characteristic of time into a discrete-time can be modeled as indicators .Quantization replaces each actual range with an approximation from a finite set of discrete values, that is important for garage and processing by means of numerical methods. The extra stages a quantizer makes use of, the lower is its quantization noise strength. In wellknown, each adc methods lose some statistics. So discrete valued signals are simplest an approximation of the non-stop-valued discrete-time signal, that is itself handiest an approximation of the unique continuous-valued continuous-time signal. However each forms of approximation errors may be made arbitrarily small by right layout.

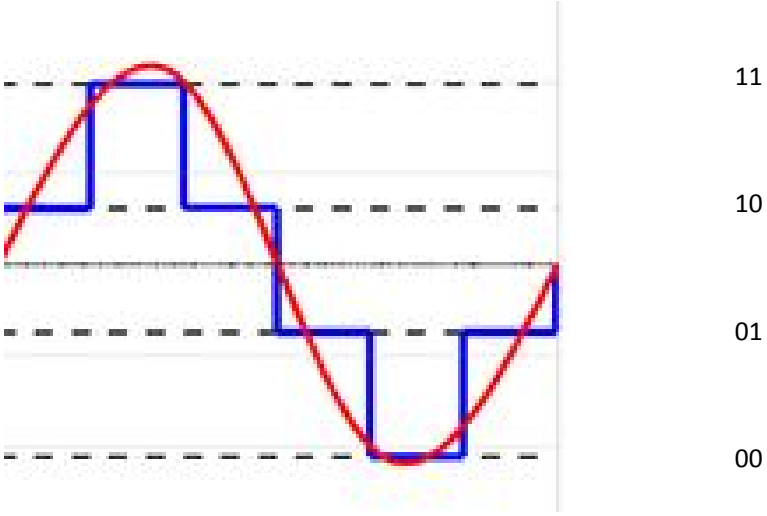

Figure N.O. 2-bit resolution with four levels of quantization compared to analog.

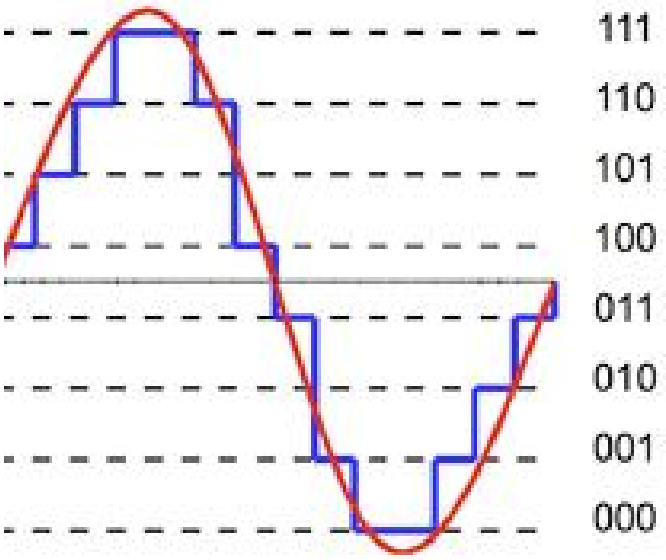

Figure NO 3, 3-bit resolution with eight levels.

CONCLUSION

The analysis of quantization entails reading the amount of facts which is typically measured in digits or bits or bit charge, that is used to represent the output of the quantizer, and reading the lack of precision that is introduced via the quantization method (that's called the distortion). The overall subject of such study of fee and distortion is called fee distortion idea.

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